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SPRINGFIELD ARMORY

SPRINGFIELD, MASSACHUSETTS
RESEARCH AND DEVELOPMENT

Report: SA-TR20-9102

Date: 31 January 1963

Report Title: Bibliography of Springfield Armory Technical Reports
and Notes on Materiel.
(1 January 1961 - 31 December 1962)

Approved

Stanley C. Skeiber
STANLEY C. SKEIBER
Lt Col, Ord Corps
Chief, Res and Eng Div

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Prepared by Springfield Armory, Springfield, Mass.

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REPORT
SA-TR20-9102

ABSTRACT

This bibliography is a compilation of Technical Reports and Notes on Materiel prepared and published by Springfield Armory Research and Engineering Division. This bibliography covers the period from 1 January 1961 to 31 December 1962. Abstracts of Technical Reports are included in this bibliography.

**REPORT
SA-TR20-9102**

FOREWORD

This bibliography contains a listing of Springfield Armory Technical Reports and Notes on Materiel published from 1 January 1961 to 31 December 1962.

Initial distribution of these reports has been made by Springfield Armory.

Reports published from 1 January 1948 to 30 June 1959 are listed in SA-TR20-9100 dated 30 September 1959.

Reports published from 1 July 1959 to 31 December 1960 are listed in SA-TR20-9101 dated 16 February 1961.

REPORT
SA-TR20-9102

NOTATION

<u>Symbol</u>	<u>Identification</u>
NM	Notes on Materiel
TR	Technical Report

REPORT
SA-TR20-9102

<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
3-1907	NM	Notes on Development Type Materiel for Machine Gun, 7.62mm, Flexible, M73C, and for Mount, Tripod, Machine Gun, XM132, P. W. Marshall, 17 Oct 60.
5-4003	TR	Test of M19 Cupola with Caliber .50, M85 (T175) Tank Machine Gun, F. K. Wolfe, 1 June 61. Unclassified report. Nonlimited distribution.
		<p>ABSTRACT: An investigation was made to study the functioning of the T175 (M85) gun when mounted in the M19 cupola; to observe loading, feeding, and ejection characteristics of ammunition; to ascertain servicing problems and recommend corrective measures; and to determine the durability of all components. Firing tests were conducted with the T175E1 gun installed in the cupola and 2,339 rounds were fired. Firing tests were conducted with the T175E2 gun installed in the cupola and 9,363 rounds were fired. These tests were made under simulated service conditions. Limited ammunition box capacity of 200 rounds not only restricts the tactical value of the high firing rate but also reduces the potential of the weapon for each engagement. Test procedure is described, and results discussed.</p>
5-4005	NM	Notes on Development Type Materiel for Machine Gun, Caliber .50, Flexible, M85C, and for Mount, Tripod, Machine Gun, XM133, C.W. Baker, Jr., 1 Sep 61.
7-1709	TR	Hook and Eye Roller Shaft and Locking Block Design, 20mm, M61, Automatic Gun, E. A. Humphrey, 20 June 61. Unclassified report. Nonlimited distribution.
		<p>ABSTRACT: An evaluation was made to study proposed modifications in the design of the roller shafts and the locking blocks of the 20mm M61 automatic gun. A "hook-and-eye" type of roller shaft and locking block was designed and developed by the Armory. Various models of this design were subjected to test firings and analysis. Results are given.</p>

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
11-2619	NM	Notes on Development Type Materiel for Rifle, 7.62mm, T44E6, A. J. Lizza, 20 Jun 61.
11-2629	TR	Experimental Heat Resistance Tests on Fiber Glass Reinforced Plastic Handguards for the M14 Rifle, K. A. Jorczak, 6 Nov 61. Unclassified report. Nonlimited distribution.
		<p>ABSTRACT: An investigation was made to obtain data concerning the heat resistance of the M14 fiber glass reinforced plastic handguards. These handguards had various modifications of the inner surface. Test procedure is described, and results discussed. Handguards with fiber glass reinforced plastic polyester construction are superior to wood with regard to heat resistance. No difference was shown in the heat resistance of the various polyester type fiber glass reinforced plastic constructions tested. It was recommended that further investigation be made to improve the heat resistance of the M14 fiber glass reinforced plastic handguard.</p>
11-2634	TR	A comparison of Polyethylene Glycol Treated Black Walnut M14 Gunstocks, M. S. Spivak, 5 Oct 62. Unclassified report. Nonlimited distribution.
		<p>ABSTRACT: Polyethylene Glycol E600 impregnated M14 gunstocks were compared with standard M14 gunstocks for ease of machinability, effect on corrosion of steel in contact with polyglycol, weight differences, dimensional stability, durability under sustained fire, and firing accuracy under varied conditions. The treated gunstocks (1) exhibited better dimensional stability toward moisture than the standard M14 gunstocks, (2) could be cut just as easily in machining, but were heavier and more costly to sand, (3) gained more weight in humid conditions, and (4) did not appear to stand up as well under sustained fire. These treated stocks were not statistically superior in firing tests. Procedure is given and results discussed.</p>
11-2712	NM	Notes on Development Type Materiel for the Rifle, Spotting, 15mm, XM90, I. H. Atwood, 20 Jun 61.

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
11-2713	NM	Notes on Development Type Matériel for Rifle, Spotting, 20mm, XM69, I. H. Atwood, 20 Jun 61.
16-1060	TR	Rifle Grease for Use in Rain, R. L. Keleher, 14 Feb 61. Unclassified report. Limited distribution (For Official Use Only).
		ABSTRACT: An investigation was made to evaluate greases for use on the 7.62mm, M14 rifle. These greases were evaluated under conditions that simulated rain. Results show that weapon per- formance was best with Lubriplate 130A. Test procedures are given, and results discussed.
18-1073	TR	Aluminum Coatings on Steel, R. E. Bessey, 1 Mar 61. Unclassified report. Limited distribution. (For Official Use Only).
		ABSTRACT: Tests were conducted to determine the resistance of aluminum-coated steel to oxidation at high temperatures. Coatings were applied by four methods: (1) dipping in molten aluminum, (2) dipping in molten aluminum followed by a subsequent heat-treatment to diffuse the aluminum, (3) spraying followed by diffusion, and (4) a cementation process. Tests were con- ducted at temperatures of 1500°F. The coatings provided protection from oxidation at tempera- tures up to 2400°F. The best results were obtained with relatively thick coatings. Procedure is described, and results discussed.
18-1082	TR	Production Hard-Chromium-Plating of M14 Rifle Barrel, R. J. Girard and E. F. Koetsch, 12 Jan 60. Unclassified.
		ABSTRACT: This report describes in detail the procedure used in production hard-chromium-plating of the 7.62mm rifle, M14, barrel. Tool marks and other irregularities not consistent with good machining practices prevent satisfactory adherence of the chromium plate. Results of this procedure are given.

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
19-1213	TR	Summary Report on Investigation of the Use of Powdered Metal Components for Small Arms Weapons, J. F. Panda, 15 Mar 61. Unclassified report. Limited distribution. (For Official Use Only).
		<p>ABSTRACT: This report summarizes results of investigations made to determine the feasibility of using powdered metal fabrication processes in the manufacture of components for small arms weapons. Inconsistent length of service life of components indicated the need of nondestructive testing procedures for quality control of powdered metal parts. (These procedures are being investigated.) Excellent physical properties were obtained with hot-coining techniques. Mechanical properties determined on a test bar heat-treated to Rockwell C36 were: tensile strength, 207,300 p.s.i.; yield strength, 200,000 p.s.i.; elongation in 1 inch, 7.8 per cent; reduction of area, 29.2 per cent; density, 99.5 per cent of maximum. Procedure is given, and results discussed.</p>
19-1215	TR	Relationship of Properties of Selected Cemented Carbides with Machining Performance, H. R. Erard, 21 Feb 60. Unclassified report. Nonlimited distribution.
		<p>ABSTRACT: An investigation was made to determine the relationship of metallographic, chemical, and physical characteristics of several submitted commercial carbide tool tips. A correlation was made between properties (metallographic, chemical, and physical) and cutting efficiency. This cutting efficiency was determined by tool life. The tips were rated on microstructure; freedom from cracks; density; porosity; thickness of binder; size, type, and distribution of carbide particles. Investigative procedure is described and results discussed.</p>
19-1217	TR	An Investigation of Ultrasonic Inspection Methods for Sintered Powdered Metal Compacts, R. D. Korytoski, 3 Oct 60. Unclassified report. Nonlimited distribution.

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
		<p>ABSTRACT: Progress is reported on a continuing study to determine the feasibility of utilizing ultrasonic attenuation methods in nondestructive inspection of cast and sintered small arms components. Studies are summarized concerning techniques and equipment designed and developed for ultrasonic measurement of cast, sintered, and wrought ferrous material. Influence of variables such as density, grain size, surface preparation, filler substances, degree of sintering, and specimen geometry on ultrasonic attenuation is discussed.</p>
19-1505	TR	<p>Nondestructive Inspection of Receivers for the 7.62mm M14 Rifle by Electromagnetic Methods, R. D. Korytoski, H. P. Hatch, and E. H. Abbe, 6 Apr 61. Unclassified report. Limited distribution. (For Official Use Only).</p> <p>ABSTRACT: Studies were made of various methods to develop a nondestructive test method for segregating receivers made from materials other than the specified resulphurized 8620H steel. Electromagnetic tests, distribution studies, spectrographic results, and metallurgical examinations of hardness and microstructure were made. The electromagnetic method gave excellent correlation with spectrographic results. Electromagnetic test method was recommended to segregate receivers made from materials other than the specified resulphurized 8620H steel. Test procedures are described, and results discussed.</p>
19-1506	TR	<p>Properties and Methods of Nondestructive Testing of Receivers for 7.62mm M14, R. D. Korytoski, H. P. Hatch, and E. H. Abbe, 7 Nov 61. Unclassified report. Limited distribution. (For Official Use Only).</p> <p>ABSTRACT: Studies were made to develop a non-destructive test for the segregating of receivers made from materials other than the specified resulphurized 8620H steel, and to determine the</p>

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feasibility of using the electromagnetic test for this segregation. The electromagnetic comparison test gave 100 per cent correlation with spectrographic analysis results of 554 receivers. The developed method did not correlate completely with core properties in the receiver lug areas. The results obtained by this method are influenced by variations in the heat-treat procedures. It was recommended that the electromagnetic method be used in conjunction with core hardness predictions by Rockwell C and D measurements at designated locations. Test procedures are described.		
19-1507	TR	Properties and Methods of Nondestructive Testing of Bolts for the 7.62mm M14 Rifles, R. D. Korytoski, H. P. Hatch, and E. H. Abbe, 4 Jan 62. Unclassified report. Limited distribution. (For Official Use Only).
ABSTRACT: Studies were made to develop adequate inspection methods of evaluating properties of material used in the fabrication of the 7.62mm M14 bolts and to determine the feasibility of using the developed method for final and in-process inspection. These studies included (1) investigation of bolt malfunction, (2) nondestructive tests re magnetic permeability comparisons, measurements of basic magnetic properties, oscilloscope wave form pattern studies, hardness investigations, (3) bolt segregation tests, (4) simulated impact tests and (5) application to final and in-process inspection. A test method combining Rockwell C surface hardness, magnetic permeability readings, and oscilloscope wave forming patterns was developed to evaluate properties of material used in the 7.62MM M14 bolt. The combination test method was found to be too complicated to specify as a final or in-process inspection method. A magnetic comparison method similar to that employed in the suggestion program could be used as a means to determine uniformity of components within individual heat lots. It was recommended that the investigative program be continued.		
20-2137	TR	An Evaluation of the Accuracy Characteristics of the Caliber .30 Duplex Cartridge as Fired from a Standard M1 Rifle (U), A. J. Lizza, J. F. O'Neil, and S. D. Caloccia, 1 Dec 61. Confidential report. Limited distribution.

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
		<p>ABSTRACT: Evaluation tests were conducted to determine the cause of performance deficiencies of the Duplex caliber .30 ammunition. Accuracy tests were conducted in three phases. The first phase of the test was conducted under ambient and elevated barrel temperature conditions. The second phase was designed to duplicate as closely as possible an actual firing schedule. The third phase was designed to verify the accuracy of the zeroing procedure. Test procedure is described, and results discussed. (U)</p>
20-2809	TR	<p>Feasibility Study of a Variable Firing Rate Function Generator for Analog Computers, D. Gelfond, 10 Oct 60. Unclassified report. Nonlimited distribution.</p> <p>ABSTRACT: A feasibility study is presented of a function generator to simulate the firing pulses of an externally powered machine gun during the analog computer analysis of the recoil motion of the gun. The function generator has a rate that can be varied to simulate the change in firing rate that occurs during the firing acceleration interval of the operational cycle of the weapon. A heterodyne system with a voltage-controlled oscillator was one of the systems studied and found to be impractical. The second system was an electronic time interval generator. This system was found to be the most practical. A variable firing rate function generator can be developed to reproduce with reasonable accuracy the performance of an externally driven weapon during the acceleration period.</p>
20-9101	TR	<p>Bibliography of Springfield Armory Reports - Technical, Memorandum, Notes on Materiel - Res and Eng Div, 16 Feb 61. Unclassified report. Nonlimited distribution.</p>

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<u>NUMBER</u>	<u>TYPE</u>	<u>TITLE</u>
ABSTRACT: Presented is a bibliography of Springfield Armory reports - technical, memorandum, notes on materiel - prepared and distributed from 1 Jul 59 to 31 Dec 60.		
20-9207	NM	Notes on Development Type Materiel for the Caliber .30 M37 Armament Kit, KX-13-A1-2, for Use on H-13E, H-13G, and H-13H Army Helicopters, G. H. Bornheim, 3 Apr 61.
20-9208	NM	Notes on Development Type Materiel for the Armament Subsystem, Helicopter, 7.62mm Machine Gun, Twin XM2, for Use on H-13E, H-13G, and H-13H Army Helicopters, F. F. Cabana, 1 Aug 62.
20-9209	TR	Helicopter Accuracy Study, A. H. LaRiviere J. R. Mayer, J. F. O'Neil, 8 Aug 62. Unclassified report. Nonlimited distribution.
ABSTRACT: A study was made to determine the accuracy of the XM153 (Quad) armament subsystem. Target acquisition and tracking capabilities of this subsystem were compared with those (results) presented in the referenced report. Basic accuracy of the 7.62MM M73 machine gun fired from the HU-1A helicopter equipped with the XM153 armament subsystem was determined. Also, basic accuracy of the 7.62MM M60 machine gun fired from the H-13H helicopter equipped with the XM2 armament subsystem was determined. Recommendations were made for improvement of the XM153 armament subsystem, and for future study and evaluation of the helicopter armament program. Test procedure is described and results discussed.		

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